Illinois Commerce Commission

Assessment of AmerenCIPS'

2001 Reliability Report and

Reliability Performance for

Calendar Year 2001

Pursuant to 83 Ill. Adm. Code 411.140

October 2002

1. Executive Summary

Pursuant to Section 16-125 of the Illinois Public Utilities Act and the Commission's electric reliability rules as found in 83 Illinois Administrative Code, Part 411 ("Part 411"), AmerenCIPS filed its annual electric reliability report for the 2001 calendar year. This document details Staff's assessment of AmerenCIPS' reliability report and Staff's evaluation of AmerenCIPS' reliability performance for calendar year 2001.

AmerenCIPS provided the information required by Part 411 in the supplemental filing of its 2001 Reliability Report. AmerenCIPS' reliability report organization makes locating specific information difficult, as information in the report is not listed in the order or under the same headings as Part 411 requirements.

AmerenCIPS' plan to improve or maintain reliability has not changed appreciably from the plan it presented last year, with one exception. Beginning in 2002, AmerenCIPS' plan for reliability improvement includes a specific project to install fuses on tap lines. Staff is pleased with the addition of this project since fuses on more tap lines should reduce the number of interruptions that affect the entire circuit, and enable the utility to locate the cause of the interruption more quickly. Staff agrees that the other specific projects and operating practices listed in AmerenCIPS' plan should also help improve or maintain reliability to its customers.

Of special interest is AmerenCIPS commitment to achieve a tree trimming cycle of no longer than four years, by June 30, 2004. Staff discovered severe tree conditions during inspection of some circuits, and believes that AmerenCIPS must either trim trees more effectively, or reduce the time between trimming trees in areas where trees grow back to contact the lines more quickly than four years. AmerenCIPS doubled the number of its contract tree crews from 2000 to 2001. Staff will continue to monitor AmerenCIPS' progress toward keeping trees clear of its distribution lines.

During 2000, AmerenCIPS' customers experienced the highest system average interruption frequency (SAIFI), but one of the lowest customer average interruption duration (CAIDI) of all the reporting electric utilities. This means that, in general, interruptions to customers on AmerenCIPS' system happened more often than they did to customers served by other Illinois utilities, but that when electric service was interrupted, AmerenCIPS restored it relatively quickly. AmerenCIPS' low average interruption duration index during 2001 is commendable, however, its high average frequency indices cause concern. AmerenCIPS also had relatively high frequency indices (SAIFI and CAIFI) in 2000.

Weather related interruptions comprised 29% of all AmerenCIPS' interruptions during 2001. These weather-related interruptions accounted for 63% of the duration of all outages reported on AmerenCIPS' system. Staff is concerned that the duration of AmerenCIPS weather-related interruptions appear to be getting longer. AmerenCIPS' reported reductions in the number of operating personnel over the last few years, and Staff believes this may be affecting its ability to respond promptly to weather-related interruptions. Fewer field personnel are available to respond to work locations during storms.

For 2001, AmerenCIPS' O&M (operations and maintenance) expenditures for its distribution system were 18% higher than planned in its 2000 Reliability Report. A comparable increase in O&M funding for its distribution system is planned for 2002 through 2004. In part, this budget increase will aid AmerenCIPS' increased tree trimming efforts.

Staff believes the reliability improvements that AmerenCIPS planned or executed to reduce the risk of customer interruptions on its worst performing circuits were appropriate. During the summer of 2002, Staff inspected seven of AmerenCIPS circuits that had an interruption frequency higher than AmerenCIPS' system average. Staff found some circuits were well maintained, some had extensive tree contacts throughout, and some had deteriorated facilities that appeared to be in need of repair or replacement.

Staff recommends several steps AmerenCIPS should take to improve electric service reliability to its customers. These recommendations are summarized below:

- *AmerenCIPS should proceed with its specific project to install fuses on tap lines.*
- *AmerenCIPS should trim trees to achieve a tree trimming cycle of no longer than four years (by June 30, 2004, or sooner), and trim trees in some areas more frequently.*
- *AmerenCIPS should review the population of lightning arresters on its distribution circuits and install additional units where appropriate; especially on those rural circuits where facilities exhibit signs of lightning damage.*
- *AmerenCIPS should consider ways to reduce the number of intentional interruptions.*
- *AmerenCIPS should regularly inspect its own distribution circuits and promptly follow through with related repairs.*

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2. Introduction

This document assesses AmerenCIPS' 2001 Reliability Report, and evaluates AmerenCIPS' reliability performance for calendar year 2001.

Beginning with the year 1999 and every three years thereafter, 83 Illinois Administrative Code Part 411.140 requires the Commission to assess the annual reliability report of each jurisdictional entity and evaluate the entity's reliability performance. Code part 411.140 requires the Commission evaluation to:

A) Assess the reliability report of each entity.

B) Assess the jurisdictional entity's historical performance relative to established reliability targets.

C) Identify trends in the jurisdictional entity's reliability performance.

D) Evaluate the jurisdictional entity's plan to maintain or improve reliability.

E) Identify, assess, and make recommendations pertaining to any potential reliability problems and risks that the Commission has identified as a result of its evaluation.

F) Include a review of the jurisdictional entity's implementation of its plan for the previous reporting period.

3. Description of AmerenCIPS' Customers and Service Territory

During 2001, AmerenCIPS provided electric service to approximately 326,430 customers in a 20,000 square mile area in central and southern Illinois. AmerenCIPS divides its operating area into six regions, and maintains its corporate headquarters in Springfield. The names and geographic locations of AmerenCIPS' regions can be described by moving clockwise around central and southern Illinois as follows:

- Eagle View Region is furthest to the northwest, with headquarters in Quincy;
- Four Rivers Region is to the east, with headquarters in Macomb;
- Northern Prairie Region, surrounded by Illinois Power and ComEd's operating areas, is to the northeast, with headquarters in Paxton;
- Heritage Region is directly south, with headquarters in Mattoon;
- Wabash Region is further south, with headquarters in Olney; and
- Shawnee Region is to the southwest, with headquarters in Marion.

4. Description of AmerenCIPS' Electric Distribution System

The majority of AmerenCIPS' facilities are located in rural/agricultural areas with approximately 9900 miles of distribution at 15kV and below. Over 99% of these facilities are made up of overhead circuits that require some amount of tree trimming.

Subsection 411.120(b)(3)(G) requires utilities to report on the age of distribution equipment. AmerenCIPS lists the average age of its substation equipment as 18.4 years, with a 30-year depreciable life; its poles and fixtures as 14.8 years, with a 35-year depreciable life; and its distribution transformers as 15.8 years, with a 30-year depreciable life.

5. Assessment of AmerenCIPS' 2001 Reliability Report

83 Illinois Administrative Code Part 411 requires each non-exempt jurisdictional entity to file an annual reliability report for the previous year with the Chief Clerk of the Commission, by June 1. AmerenCIPS' initial 2001 Reliability Report, filed May 31, 2002, did not fully comply with the requirements of Section 411.120(b)(3), but its supplemental filing, on July 23, 2002, provided additional information to satisfy code requirements. In future Reliability Reports, Staff would like AmerenCIPS to expand its discussion about its plan for reliability improvements, especially with regard to expenditures planned for specific projects.

AmerenCIPS' Reliability Report provides tables of reliability indices, operating practices, specific reliability projects, listings of interruptions with causes, the ages & condition of its system, and a listing of its worst performing circuits for the year.

AmerenCIPS organizes its report in a way that does not follow the order that requirements are listed in Section 411.120. AmerenCIPS' report organization makes locating specific information difficult. AmerenCIPS provides assistance by noting applicable Part 411 references following some entries, however, Staff again suggests, as it has for the last two years, that AmerenCIPS modify the organization of its report to sequentially follow the requirements of Section 411.120. Doing so would aid AmerenCIPS in meeting all requirements with its initial report filing, and aid Staff when attempting to locate specific information within the report.

6. AmerenCIPS' Historical Performance Relative to Established Reliability Targets

Subsection 411.140(b)(4)(A-C) sets forth reliability targets that a jurisdictional entity must strive to meet or exceed. Table 1 summarizes these reliability targets. The targets specify a maximum number and duration of controllable outages that any customer should expect to experience. In 2001, AmerenCIPS had no customers experience controllable interruptions in excess of these targets.

Table 1: Part 411 Reliability Targets

Immediate primary source of service operation level	Maximum number of controllable interruptions in each of the last three consecutive years.	Maximum hours of total interruption duration due to controllable interruptions in each of the last three years.
At 69kV or above	3	9
Between 15kV & 69kV	4	12
At 15kV or below	6	18

A “controllable interruption” is defined in Part 411.20 as:

“…*An interruption caused by or exacerbated in scope and duration by the condition of facilities, equipment, or premises owned or operated by a jurisdictional entity, or by the action or inaction of persons under a jurisdictional entity’s control and that could have been prevented through the use of generally accepted engineering, construction, or maintenance practices*”.

Generally, utilities report interruptions as "controllable" only if the utility's contribution to the interruption is flagrant. Interruptions with more subtle utility involvement, such as poorly placed poles that are hit by vehicles, or untrimmed trees that blow into the lines during storms, are not typically classified "controllable" by utilities. Staff believes that if, after each interruption, the electric utility seriously considered whether it could have taken reasonable steps to prevent the interruption from occurring, the number of interruptions classified as "controllable" would be much higher.

Table 2 lists controllable interruptions by cause category as reported by AmerenCIPS for 1999-2001. The number of interruptions AmerenCIPS designated as controllable was approximately equal in 2000 and 2001. For both years, AmerenCIPS categorizes 623 controllable interruptions as “Intentional”, which equated to 59% of the total number of controllable interruptions. For 2001, intentional interruptions accounted for nearly 10% of all interruptions on AmerenCIPS' system, and approximately 5% of all outage durations.

Table 2: AmerenCIPS' Controllable Interruptions by Cause (1999-2001)

Cause	2001	2000	1999
Other Alternative Retail Electric Supplier	0	0	0
Jurisdictional Entity / Contractor Personnel Errors	87	62	60
Customer	0	0	0
Public	4	1	2
Weather Related	36	41	11
Animal Related	1	0	1
Tree Related	295	318	275
Overhead Equipment Related	0	1	2
Underground Equipment Related	0	0	0
Intentional	623	623	378
Transmission and Substation Related	1	2	6
Unknown	0	0	0
Other	6	1	1
TOTAL	1053	1049	736

7. Analysis of AmerenCIPS' Reliability Performance in 2001

Reliability indices are useful tools in monitoring an electric utility’s reliability performance. These indices, submitted by all reporting utilities, can be used to compare the reliability performance of various utilities, and provide an indication of whether a given utility’s performance is improving or degrading over time. Since each reporting utility has its own procedures, including reporting and recording methods, direct reliability index comparisons between utilities are not exact, but can be helpful.

Part 411 requires each reporting Illinois utility to report the following indices:

- SAIFI = $\frac{\text{Total \# Customer Interruptions}}{\text{Total \# Customer Served}}$
- CAIDI= $\frac{\text{Sum of all Interruption Durations}}{\text{Total \# Customer Interruptions}}$
- CAIFI = $\frac{\text{Total \# Customer Interruptions}}{\text{Total \# Customers Affected}}$

Table 3 (a-c) shows the year 2001 indices submitted by all reporting utilities for their Illinois systems. Each table is sorted from best to worst performance.

Table 3: 2001 Reliability Indices for all Reporting Utilities

a) SAIFI

UTILITY	SAIFI
MidAmerican	.843
ComEd	1.29
Illinois Power	1.29
AmerenUE	1.37
CILCO	1.40
AmerenCIPS	***1.68***

b) CAIDI

UTILITY	CAIDI
ComEd	103
AmerenCIPS	***110***
CILCO	121
Illinois Power	133
AmerenUE	158
MidAmerican	180

c) CAIFI

UTILITY	CAIFI
MidAmerican	1.84
ComEd	1.98
AmerenUE	2.04
CILCO	2.07
AmerenCIPS	***2.08***
Illinois Power	2.10

Compared to 2000, AmerenCIPS' relative position in the SAIFI and CAIDI tables worsened, and its relative position stayed the same in the CAIFI table. AmerenCIPS' SAIFI of 1.68 indicates that its customers experienced an average of 1.68 interruptions during 2001, as opposed to 1.54 interruptions last year. The increase in CAIDI, from 104 in 2000 to 110 in 2001, indicates that the average length of AmerenCIPS' customer-interruptions increased to 110 minutes during 2001. The decrease in CAIFI to 2.08 in 2001, from 2.23 in 2000, indicates that AmerenCIPS' interruptions less frequently affected the same customers. These indices seem to indicate very little change in AmerenCIPS' overall reliability performance from 2000 to 2001.

At the end of 2001, AmerenCIPS had 328 customers with an Alternative Electric Supplier: a significant reduction from 436 in 2000. The CAIDI and CAIFI experienced for these customers during 2001 was 113.5 and 1.47, respectively. These index values are either very close (in the case of CAIDI) or an improvement (in the case of CAIFI) to AmerenCIPS system values, indicating non-discriminatory treatment.

"Worst performing circuits" are circuits that are among the 1% of circuits in each operating area that have the highest value for each reliability index. Section 411.120 requires utilities to report worst performing circuits (Subsection 411.120(b)(3)(I)) and state corrective actions taken or planned to improve these circuit performances (Subsection 411.120(b)(3)(J)). Table 4 shows twenty-four AmerenCIPS circuits that were determined to be worst performing for 2001.

Table 4: AmerenCIPS' Worst Performing Circuits for 2001

a) Due to SAIFI and CAIFI

Circuit	Region	SAIFI	CAIFI
U10525	Four Rivers	5.9	5.9
U59001	Four Rivers	4.7	4.7
U41545	Eagle View	4.7	4.7
Y51506	Heritage	4.6	4.6
S83533	Shawnee	4.5	4.5
T22508	Shawnee	4.1	4.1
V22555	Eagle View	4.0	4.1
S36571	Shawnee	3.9	4.0
Y98532	Heritage	3.3	3.3
Y31589	Wabash	3.2	3.2
X72535	N. Prairie	3.1	3.1
X86543	Wabash	3.0	3.0

b) Due to CAIDI

Circuit	Region	CAIDI
X82004	N. Prairie	1755
S28551	Shawnee	1183
T11509	Shawnee	754
S04512	Shawnee	743
V92542	Four Rivers	600
Y98001	Heritage	545
Z10500	Wabash	540
V92540	Four Rivers	539
V49008	Eagle View	516
V33006	Eagle View	486
Y36541	Wabash	412
Y10011	Heritage	353

As part of its review of AmerenCIPS' 2001 reliability performance, Staff engineers requested information on 10 additional AmerenCIPS' circuits that were not included as worst performing circuits, but that had high SAIFI values. During the summer of 2002, Staff conducted field inspections on seven of AmerenCIPS' circuits that were either worst performing during 2001, or had a high SAIFI for the year. Staff inspected one circuit from each of AmerenCIPS' six operating regions plus one circuit that was a worst performing circuit in both 2001 and 2000 (Y31-589). These inspections allowed Staff to verify that work was performed on the circuits as stated in AmerenCIPS' Reliability Report, and to see if there were any visible reasons for the worst performance of these circuits. For example, Staff looked for poor tree trimming practices, broken equipment, rotten poles, damaged equipment, etc. Descriptions of the circuits and Staff's inspections follow:

Circuit Y31-589 (Wabash Region): SAIFI=CAIFI=3.2; CAIDI=58

This 12kV rural circuit supplies mostly agricultural and residential customers near the community of Noble. Y31-589 was a worst performing circuit in both 2001 and 2000. Of the twenty-five outages on this circuit in 2001, eleven were overhead equipment related, three due to weather, three due to animals, and two were due to unknown causes. Only one interruption was identified as tree-related. During 2000, AmerenCIPS completed several jobs to replace bad-order poles. In March of 2002, AmerenCIPS completed repair of facility problems found during its own inspection of this circuit. Additional fuses are planned during 2002, and the pole inspection program will continue. Tree trimming was last completed at the end of 2000. Staff's inspection confirmed that many new poles have been installed. The circuit appeared to be reasonably well maintained, with no tree contacts observed. Items of concern noted by Staff were: a failing cross-arm that held transformer fuses, a woodpecker damaged

pole, two locations of broken or gunshot strands on neutral wire, and one ground wire that ran down the pole to a ground rod that appeared to have been snagged by a tractor. It appeared AmerenCIPS did an excellent job of following up on its own inspection findings, and at this time Staff sees no reason this circuit should be a SAIFI worst performer in 2002.

Circuit X86-543 (Wabash Region): SAIFI=CAIFI=3.0; CAIDI=94

This 12kV rural circuit supplies mostly agricultural and residential customers near the communities of Annapolis, York, West York, Hutsonville, and West Union. X86-543 was a worst performing circuit in 2001 due to SAIFI, and has had a relatively high SAIFI for the last three years. Of the roughly fifty outages in 2001, eleven were due to trees, ten to weather, ten to animals, eight to overhead equipment problems, and five are categorized as unknown. AmerenCIPS conducted its own inspection of this circuit, resulting in several reconstruction jobs. Tree trimming was completed in March 2002. Staff's inspection confirmed that thorough tree trimming had recently been completed throughout the circuit. Staff informed AmerenCIPS of its discovery of a broken pole, near York, and AmerenCIPS was responsive in correcting this potentially hazardous condition. Overall, the facilities appeared to be in good shape, with relatively few issues noted by Staff. Items noted were: several locations where vines grew to the primary conductors (Photo 1), shell-rotted poles, a few poles with split tops or split cross-arms, and a transformer that had apparently had its mounting brackets bent (Photo 2). This is a very lengthy circuit, and Staff believes AmerenCIPS has done a good job with it, though it may also wish to review tap line fusing.

Photo 1: Vines Growing to Primary Level of Pole (Circuit X86-543)

Photo 2: Bent Mounting Brackets on Pole-mounted Transformer (X86-543)

Circuit Y51-506 (Heritage Region): SAIFI=CAIFI=4.6; CAIDI=111

This 12kV circuit, a 2001 worst performing circuit due to SAIFI, supplies mainly residential, commercial, and agricultural customers in and around the communities of Paris and Vermillion. Of the thirty-nine outages on this circuit in 2001, nine were overhead equipment related, eight due to weather, six due to trees, five due to animals, and four were due to unknown causes. Tree trimming for this circuit was last completed in 2000. AmerenCIPS states most tree-related outages were due to a problem area near a golf course where trees were difficult to trim due to access, however, Staff discovered trees contacting the lines throughout the circuit (Photos 3 & 4). Staff believes AmerenCIPS should schedule tree trimming on this circuit again soon. Other than having a multitude of tree contacts, the circuit appeared to be well maintained. Staff noted one pole that exhibited woodpecker damage. Staff's recommendations for this circuit, in addition to trimming the trees again, is to be pro-active with the installation of animal guards in specific areas where squirrel populations are high.

Photo 3: New Growth Contacting Primary in Paris (Y51-506)

Photo 4: Conifer into Primary in Paris (Y51-506)

Circuit X72-535 (Northern Prairie Region): SAIFI=CAIFI=3.1; CAIDI=33

This 12kV circuit, a 2001 worst performing circuit due to SAIFI, supplies mainly agricultural and residential customers in and around the community of Forrest. Of the twenty-two outages on this circuit in 2001, nine were weather-related, four due to animals, three due to overhead equipment problems, and three were due to unknown causes. Tree trimming was last completed in the first quarter of 2002. Staff noted only one location where a tree was growing close to the primary. Staff encourages AmerenCIPS to follow-through on its plans to evaluate the need for additional tap line fuses. Staff's main concern for customers supplied by this circuit relate to the apparent age of the facilities, with visibly deteriorated poles throughout the circuit (Photo 5). Staff also noted a mid-span broken primary strand on a rural tap line, which could also be attributed to the age of the wire. Two pole replacement projects were completed in 2000, and Staff believes AmerenCIPS should consider additional projects.

Photo 5: Shell-rot Pole with Splitting Cross Arm (X72-535)

Circuit S86-582 (Shawnee Region): SAIFI=CAIFI=3.3; CAIDI=183

This 12kV circuit, was not a worst performing circuit in 2001, but was inspected by Staff due to its relatively high SAIFI during both 2001 and 2000 (SAIFI=2.7 in 2000). S86-582 supplies residential and commercial customers in and around the community of Murphysboro. Of the forty-one outages in 2001, twelve were weather-related, seven due to trees, six due to overhead equipment problems, four due to animals, and five were due to unknown causes. Tree trimming for this circuit was last completed in November of 1999, and is not scheduled again until spring of 2004. Staff's inspection revealed that tree conditions are very bad throughout the circuit (Photos 6-11). In fact, vegetation issues were the only items noted by Staff. It is likely that weather-related interruptions and those interruptions classified as unknown could significantly be reduced if trees adjacent to this circuit were adequately trimmed. Staff is pleased with AmerenCIPS plans to install 35 tap line fuses, which will cause interruptions to affect fewer customers, but feels the priority for this circuit should be tree trimming.

Photo 6: Tree Growth around Primary and Transformer (S86-582)

Photo 7: Primary Burns off Growth from Top of Tree as it Swings (S86-582)

Photo 8: Tree Branches Growing between Phase Wires (S86-582)

Photo 9: Pole Covered by Shrubs and Vines with only Dead-end Insulator in View (S86-582)

Photo 10: Young Tree Surrounding Corner Pole (S86-582)

Photo 11: Limb Burning on Primary (S86-582)

- **Circuit V58-507 (Four Rivers Region):** SAIFI=CAIFI=4.0; CAIDI=116
  This 12kV circuit supplies residential and agricultural customers in and around the communities of Roseville and Swan Creek. V58-507 was not listed by AmerenCIPS as a worst performing circuit in 2001 only because two other circuits in Four Rivers Region had a SAIFI that was even worse. Of the twenty-eight outages on this circuit in 2001, nine were intentional, six were weather-related, five were due to animals, four due to overhead equipment problems, and only one was due to unknown causes. Tree trimming for this circuit was last completed in December of 2001, and not scheduled again until fourth quarter of 2005. Staff noted that AmerenCIPS reported no tree-related interruptions on this circuit during 2001. Staff did not observe any tree contacts on this circuit, and noted adequate clearance between the trees and wires throughout. Nearly all the reliability concerns noted during Staff's inspection related to aging facilities, such as shell-rot poles, split pole tops, or broken cross arms (Photos 12-14). Staff also noted there were no lightning arresters seen on this circuit.

Photo 12: Shell-rotted Pole (V58-507)

Photo 13: Example of Failing Cross Arm (V58-507)

Photo 14: Example of Pole with Split Top (V58-507)

- **Circuit V22-555 (Eagle View Region):** SAIFI=3.9; CAIFI=4.1; CAIDI=139
  This 12kV circuit, a 2001 worst performing circuit due to SAIFI, supplies mostly agricultural and residential customers in and around the communities of Shipman and Piasa. V22-555 had a relatively high SAIFI last year (2000 SAIFI=2.9). Of the fifty-nine outages on this circuit in 2001, twenty-six were weather related, ten due to overhead equipment problems, eight due to animals, and ten were due to unknown causes. AmerenCIPS reported none of the outages as tree-related. Tree trimming for this circuit was last completed in 2000, and next scheduled for the fourth quarter of 2003. AmerenCIPS states that no additional reliability improvements are scheduled for this circuit at this time. Staff found several locations where trees were contacting the primary (Photos 15-16). In addition, AmerenCIPS facilities showed varying signs of deterioration, specifically shell-rot poles and split pole tops (Photos 17-18). This circuit would likely benefit from well-placed lightning arresters, given the high number of interruptions categorized as weather-related, and signs of lightning damage on some poles. Staff observed no lightning arresters on the circuit.

Photo 15: Transformer and Primary Completely Covered by Mature Tree (V22-555)

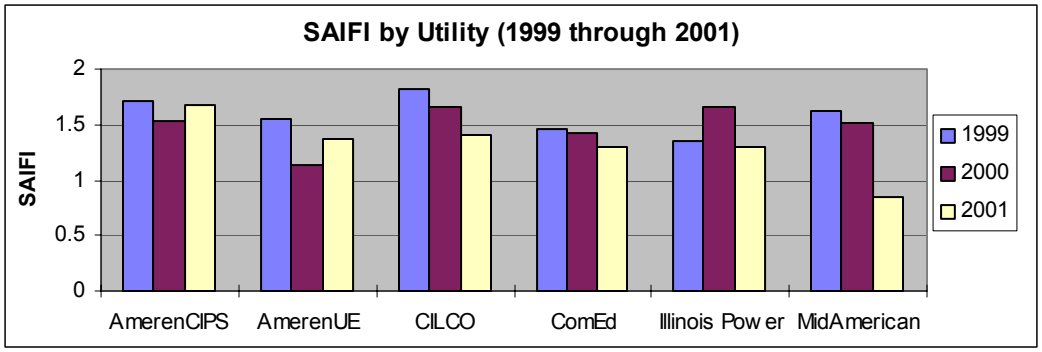
Photo 16: Tree Growing into Primary and Burning (V22-555)

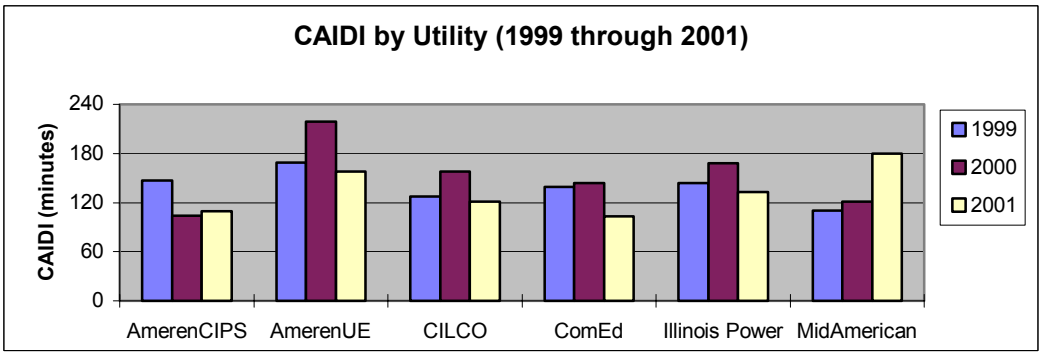
Photo 17: Splintered Cross Arm on Shell-rot Pole (V22-555)

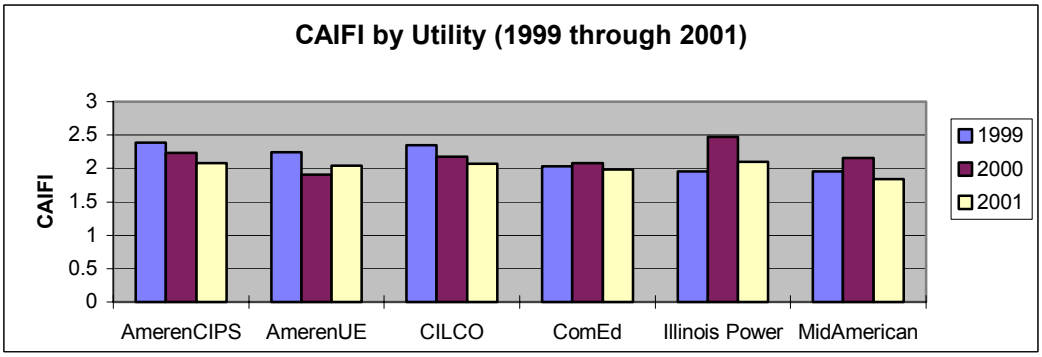
Photo 18: Example of Shell-Rot Pole (V22-555)

8. Trends in AmerenCIPS' Reliability Performance

AmerenCIPS reported increases in both its SAIFI and CAIDI for 2001, but a slight improvement in CAIFI. AmerenCIPS' reliability indices for the past three years can be compared to those of other utilities in the charts that follow.







AmerenCIPS continues to have one of the lowest CAIDI values of all reporting utilities, which means outages are generally shorter than those of other utilities, generally indicating good outage response. Conversely, AmerenCIPS had the highest SAIFI in 2001 out of all reporting utilities, and has had one of the highest out of the reporting utilities for the last three years. This high SAIFI indicates that the average number of interruptions experienced by AmerenCIPS customers was greater in 2001 than customers of any other reporting utility. Likewise, AmerenCIPS' CAIFI, though improving, has been one of the highest of all reporting utilities for the last three years, an indication that interruptions often affect the same customers.

AmerenCIPS reported 10,264 *unplanned* interruptions in 1999, 9996 in 2000, and 9629 in 2001: a steady reduction. The number of its *planned* interruptions increased by a similar amount, from 646 in 1999, to 882 in 2000, to 1259 in 2001. The combination of planned and unplanned interruptions it has reported has stayed nearly constant, from 10910 in 1999, to 10878 in 2000, to 10888 in 2001.

AmerenCIPS listed six formal reliability complaints in its 2001 Reliability Report. The subject of two of the complaints was the length of an outage, two others related to interruptions being too numerous and frequent, one to timeliness, and one related to the trimming of trees. AmerenCIPS reported seven reliability complaints in 2000, and only two in 1999.

AmerenCIPS provided a table in its 2001 Reliability Report showing the number of customers that experienced zero interruption during the year, one interruption during the year, two interruptions during the year, etc., and included this information for 2000 and 1999 as well. For the period 1999 through 2001, more than 25% of AmerenCIPS customers experienced more than two interruptions during the calendar year. Staff is pleased to see that the percentage of AmerenCIPS customers that experienced more than five interruptions decreased, from 5.7% in 1999, to 4.5% in 2000, to 3.2% in 2001.

Table 5: AmerenCIPS Customers Experiencing a Certain Number of Interruptions (1999-2001)

# Customer Interruptions	# Customers (2001)	# Customers (2000)	# Customers (1999)
0	84147	93753	88616
1	90250	87541	85329
2	66552	60138	53755
3	39544	37017	41828
4	24881	18884	20509
5	10904	11964	15522
6	5855	5875	8541
7	2460	4237	4019
8	1368	2472	2026
9	449	819	1558
10	113	867	1077
11-15	55	331	1238
16-20	0	0	15
21-25	0	0	0
26-30	0	0	0
>30	0	0	0
Total	326578	323898	324033

Staff encourages AmerenCIPS to be attentive to these statistics, and to take action to minimize repetitive interruptions to the same customers. Staff believes that AmerenCIPS' tap-line fusing project, beginning in 2002, will help identify problem areas, and reduce the number of customers that experience multiple interruptions.
The number of AmerenCIPS' interruptions related to overhead equipment decreased by 264, or 13%, from 2000 to 2001. However, the number of interruptions classified as intentional increased by 378, or 56% from 2000 to 2001. Staff believes many of these intentional interruptions were related to increased pole replacement and tree trimming activities in 2001. AmerenCIPS should consider methods to reduce the number of interruptions classified as intentional as it develops its plans for improved reliability in future years.

Table 2 illustrates that AmerenCIPS' total number of categorized interruptions was approximately the same for the past two years, after a significant increase from 1999. AmerenCIPS attributes that increase to its use of a different outage reporting system.

Table 6: AmerenCIPS' Interruption Statistics (1999-2001)

CAUSE	# Of Interruptions			Duration of Interruptions (minutes)		
	2001	2000	1999	2001	2000	1999
Weather	3185	3057	282	39,326,613	28,405,235	6,912,210
Overhead Equip.	1751	2015	1985	3,939,363	6,332,625	79,93,458
Tree	704	695	595	3,456,409	4,037,603	4,291,193
Intentional	1059	681	486	3,238,760	3,216,486	2,756,792
Animal	1935	2163	1921	3099,478	3,546,914	2,879,646
Public	426	362	368	2,618878	2,403,470	1,967,905
Transmission and Substation Related	53	57	57	2,442,819	3,270,965	3,442,237
Unknown	1035	1002	1174	1,788895	1,621,731	2,695,345
Underground Equip.	271	293	217	1,123,600	1,220,258	1,415,516
Other	300	360	673	711,446	347,790	850,528
Customer	68	95	114	680,393	1,059,760	665,295
Jurisdictional Entity/ Contractor Personnel - Errors	92	89	113	355,166	210,775	500,544
Other Alternative Retail Electric Supplier	0	1	0	0	1176	0
Total	10,879	10,870	7985	62,781,820	55,674,788	36,370,669

9. AmerenCIPS' Plan to Maintain or Improve Reliability

In its 2001 Reliability Report, AmerenCIPS states that numerous system-wide operating practices it performs have a direct bearing on reliability. AmerenCIPS considers the following seven operating practices to be among the more important ones:

1. Periodic Substation Inspections
2. Periodic Infra-red Scanning of Substations
3. Periodic Substation and Relay Equipment Maintenance and Testing
4. Periodic Line Inspection
5. Installation of Anti-Galloping Conductors in Susceptible Areas
6. Selective Animal Guard Installation
7. Periodic Review of System Reliability and System Loading

These are the same operating practices listed in AmerenCIPS' previous reliability report, indicating no changes in this aspect of AmerenCIPS' plan. Staff agrees that all of these operating practices should help to maintain or improve reliability.

In its 2001 Reliability Report, AmerenCIPS states its plan contains the following six specific reliability projects:

1. Aerial Sub-transmission Infrared Inspection:
2. Worst Performing Feeders:
3. Lightning Protection:
4. Pole Inspection and Treatment:
5. Annual Tree Trimming:
6. Tap Fusing:
   This program, which begins in 2002, will install fusing on unprotected taps along distribution main-feeders to reduce the number of complete feeder outages, and enable AmerenCIPS to more quickly identify problem locations. AmerenCIPS states this program will take more than five years to complete.

Staff agrees that AmerenCIPS' activities relating to these specific reliability projects should contribute to better service reliability to its customers. Staff is especially encouraged by AmerenCIPS' addition of tap-line fusing to its list of specific projects. Staff hopes this becomes a pro-active method to reduce the scope of future interruptions, rather than a reaction after a main-feeder interruption.

In its 2001 Reliability Report, AmerenCIPS identified its worst performing circuits (based on SAIFI, CAIDI, and CAIFI) determined individually for its six operating areas. For 2001, AmerenCIPS' worst performing circuits due to SAIFI were the same as those due to CAIFI, indicating that AmerenCIPS' interruptions frequently affect entire circuits. AmerenCIPS' addition of tap line fuses should reduce the number of interruptions that affect the entire circuits. Once its tap fusing project is established, AmerenCIPS' list of worst performing circuits due to SAIFI may contain different circuits than its list of worst performing circuits due to CAIFI.

Staff reviewed AmerenCIPS' corrective actions, taken or planned, for its 2001 worst performing circuits, and agrees the actions are a logical reaction to the interruption causes for each circuit.

As previously mentioned, AmerenCIPS has committed to achieving a tree trimming cycle of no longer than four years by June 30, 2004. Staff believes AmerenCIPS' overall reliability improvements will be linked to its ability to keep trees from contacting the lines, especially during moderate winds. Adequate tree trimming has the effect of reducing the number and scope of interruptions during storms, and likely reduces the number of interruptions categorized as unknown. Staff observed that trees appeared to be adequately trimmed along some circuits (i.e., Y31-589 and V58-507), but other circuits had significant tree contacts throughout (i.e., Y51-506 and S86-582). AmerenCIPS may need to trim some circuits more frequently than once every four years in order to keep the trees from the lines. Trees along Circuit S86-582, in Murphysboro, were last trimmed in late 1999 and early 2000, and this circuit had more numerous and more severe contacts than the other AmerenCIPS circuits that Staff inspected.

AmerenCIPS reported 10,879 interruptions during 2001, of which 1053 (10%) were controllable. Section 411.20's definition of "controllable interruption" was presented in Section 6, on page 2 of this report. The highest number of controllable interruptions reported by AmerenCIPS was classified as intentional (623, or 59%), followed by tree-related (295, or 28%). AmerenCIPS' plan to achieve a tree trimming cycle of no longer than four years should reduce the controllable tree-related interruptions. AmerenCIPS does not communicate any actions or plans to reduce the controllable interruptions categorized as "intentional". Staff believes that AmerenCIPS should consider the effect its controllable interruptions have on its customers, especially those categorized as intentional.

Four interruption classifications (weather-related, overhead equipment related, tree-related, and unknown) accounted for 66% of AmerenCIPS' interruptions in 2001. Following AmerenCIPS' tree trimming efforts during 2001, and the start of its tap-line fusing project (beginning in 2002), Staff expects the total number of AmerenCIPS' interruptions to decrease appreciably. These two projects, coupled with AmerenCIPS' pole inspection program, should help reduce the number of interruptions due to most causes, but especially these four.

10. Potential Reliability Problems and Risks

AmerenCIPS' 3185 weather-related interruptions during 2001 again made this its most common interruption cause. AmerenCIPS indicates that interruptions categorized as weather-related accounted for 29% of its interruptions for the year, and 63% of its outage durations. In 2000, weather-related interruptions accounted for 28% of AmerenCIPS' interruptions, and 51% of its outage durations. Staff is concerned that the duration of AmerenCIPS weather-related interruptions appear to be getting longer. There has been a 10% reduction in AmerenCIPS' electric operating personnel since 1999, and a 7% reduction since 2000. Staff believes reductions in personnel may be affecting AmerenCIPS' ability to respond as promptly to weather-related interruptions, as fewer field personnel are available to respond to the work locations during storms, or other emergencies.

Staff believes that weather-related interruptions, and interruptions categorized as unknown, are often associated with trees contacting the distribution lines. For example, during inspection of an AmerenCIPS circuit S86-582, near Murphysboro, Staff discovered trees contacting the power lines in dozens of locations, and noted that dozens more would be in contact during severe winds. AmerenCIPS attributed twelve of the forty-one interruptions on this circuit during 2001 to storms, seven to trees, and five were unknown. Staff believes customers on this circuit will experience many more interruptions if trees adjacent to this circuit are not trimmed again until 2004, as AmerenCIPS plans.

AmerenCIPS should consider accelerating its pole inspection/replacement project in specific areas in order to address the many poles, some supporting main-feeders, which are severely shell-rotted. Its new specific project to install tap-line fusing should help isolate interruptions caused by failing equipment, but Staff is concerned by the deteriorated condition of poles observed during its circuit inspections, especially on circuits V58-507, near Roseville, and X72-535, near Forrest.

Approximately 59% of AmerenCIPS' 1059 intentional interruptions during 2001 were identified as controllable. AmerenCIPS should be more concerned with the effect of these interruptions on its customers.

11. AmerenCIPS' Implementation of the Plan listed in its 2000 Reliability Report

Compared to its 2000 projections, AmerenCIPS' total operations and maintenance ("O&M") expenditures during 2001 were approximately 13% less than planned, and total capital expenditures were approximately 10% less than planned.

The O&M variance was largely due to transmission O&M expenditures that were only approximately 21% of AmerenCIPS' projection. AmerenCIPS indicated this reduction in transmission O&M expenditures from planned amounts was due to customer-initiated projects that never materialized.

The variance in AmerenCIPS' 2001 capital expenditures from its 2000 projections was due to lower distribution capital expenditures than anticipated, which more than offset slightly higher transmission capital expenditures.

AmerenCIPS' 2001 projections for distribution and transmission expenditures for 2002 through 2004 are illustrated in Table 7.

Table 7: AmerenCIPS' Distribution and Transmission Spending Projections for 2002 through 2004

YEAR	O & M	CAPITAL	TOTAL
2002	$46,678,718	$51,538,679	$98,217,397
2003	$47,908,346	$63,911,199	$111,819,545
2004	$49,537,316	$64,111,320	$113,648,636

For the years 2002 through 2004, AmerenCIPS anticipates an increase in its distribution O&M and capital expenditures of just over 20%, as compared to its plan from 2000. It projects a significant decrease in transmission O&M spending and more than a two-fold increase in transmission capital expenditures. The changes in AmerenCIPS' plan for its transmission system include new projects that have not yet obtained final authorization.

In its 2000 Reliability Report, AmerenCIPS listed the seven operating practices it considers most important in helping to prevent customer interruptions from occurring. These same operating practices appear in AmerenCIPS' 2001 Reliability Report.

Also listed in AmerenCIPS' 2000 Reliability Report were five specific reliability projects. AmerenCIPS' activities during 2001 associated with each of the five specific projects from 2000 are listed below:

1. Aerial Sub-transmission Infrared Inspection:

   AmerenCIPS states that this on-going project runs on a 3-year cycle. Infrared technology is used to detect overheating at connectors, switches, or other equipment. In 2001, AmerenCIPS inspected 2400 miles of 34kV and 69kV in Heritage, Northern Prairie, Shawnee, and Wabash Regions. Fifty-two "hot-spots" were detected. These "hot-spots" indicate abnormal conditions that could result in future equipment failure and interruptions. Through use of infrared, AmerenCIPS is able to detect and repair these locations prior to failure.

2. Worst Performing Feeders:

   AmerenCIPS stated in its Reliability Report for 2000 that the criteria for determining which circuits are the subject of work is not strictly determined by CAIFI, SAIDI, or CAIFI. AmerenCIPS took remedial action on ten circuits during 2001.

3. Lightning Protection:

   AmerenCIPS determines where lightning protection enhancement is required based on a four-year historical performance study, as well as recommendations by the local district. AmerenCIPS' actions in 2001 were limited to its sub-transmission circuits: twelve circuits were addressed.

4. Pole Inspection and Treatment:

   AmerenCIPS continued with its on-going project to inspect poles on its sub-transmission and distribution main-feeders. During the inspection, the external condition of a pole is visually inspected, and a drill is used to inspect the pole's core near ground level. This inspection does not evaluate cross-arms or any equipment or attachments on the pole. AmerenCIPS uses the data collected during its inspections to prepare jobs to repair or replace poles that might otherwise fail and result in interruptions to customers. In 2001, 12,400 poles were inspected.

5. Annual Tree Trimming:

   AmerenCIPS states that trees growing adjacent to its circuits are trimmed using methods that are intended to direct future growth away from the lines. In a July 5, 2001 letter to Staff, AmerenCIPS committed to achieving a tree trimming cycle of no longer than four years by June 30, 2004. AmerenCIPS' increased tree-trimming expenditures during 2001 as part of its effort to achieve this goal.

AmerenCIPS repeated these five specific projects in its 2001 Reliability Report.

In its 2001 Reliability Report, AmerenCIPS provides information on additional remediation for its worst performing circuits from 2000. Staff believes AmerenCIPS' actions on these circuits were appropriate and logical.

12. Summary of Recommendations

- *AmerenCIPS should proceed with its specific project to install fuses on tap lines.*

  Staff is pleased that AmerenCIPS included this project in its plan to improve reliability, and encourages AmerenCIPS to be pro-active by installing fuses on circuits that have a history of poor performance, rather than waiting for additional interruptions to occur prior to taking action. Staff believes fuses on more tap lines should reduce the number of interruptions that affect the entire circuit, and enable the utility to locate the cause of the interruptions more quickly.

- *AmerenCIPS should trim trees to achieve a tree trimming cycle of no longer than four years, and trim trees in some areas even more frequently.*

  Staff believes that trees contribute to many interruptions categorized as weather-related and unknown. Staff's review of AmerenCIPS' facilities in the Murphysboro area, where tree trimming was last completed in early 2000, indicated that four years might be too long between tree-trimming cycles for some areas. AmerenCIPS should strive to reduce its SAIFI and CAIFI values, and reducing the exposure its lines have to tree contacts would be a significant step towards this goal.

- *AmerenCIPS should review the population of lightning arresters on its distribution circuits and install additional units where appropriate; especially on those rural circuits where facilities exhibit signs of lightning damage.*

  Staff observed minor facility-damage on several of AmerenCIPS' rural circuits, such as pole splintering, that appeared to have been caused by lightning. Staff noticed that lightning arresters were absent from most of AmerenCIPS' circuits that were inspected. Staff recommends that AmerenCIPS add lightning arresters to some of its distribution circuits in an effort to improve reliability.

- *AmerenCIPS should consider ways to reduce the number of intentional interruptions.*

  Approximately 10% of all interruptions on AmerenCIPS' system were categorized as intentional in 2001, constituting over 5% of total outage time. AmerenCIPS should consider the impact of these interruptions within its plan to improve service reliability.

- *AmerenCIPS should regularly inspect its own distribution circuits and promptly follow through with related repairs.*

  Staff was pleased that AmerenCIPS repaired problems it found during its own inspection of Circuit Y31-589. Unfortunately, this circuit was a worst performing circuit for two years in a row prior to AmerenCIPS' completion of its corrective measures. AmerenCIPS should be more pro-active and responsive with its own distribution line inspection program so that its customers do not experience so many interruptions before corrective action is taken. Staff is disappointed that, in 2002, AmerenCIPS replaced its annual distribution system inspection program (T&D Procedure G-8) with a new procedure that specifies no maximum elapsed time between distribution system inspections (Regional Operations Procedure 101). Staff is concerned that AmerenCIPS' distribution circuit inspections do not happen frequently enough. AmerenCIPS should consider utilizing the personnel involved in its pole inspection project to simultaneously inspect other aspects of its distribution circuits.